

What is claimed is:

1. A method of forming carbon nanotubes on a substrate comprising the steps of:
  - providing a chemical vapor deposition chamber having a coiled filament disposed therein;
  - supporting a substrate having a catalytic coating provided thereon inside the coiled filament;
  - evacuating air, if present, from the chamber;
  - heating the filament and applying a bias voltage between the filament and the substrate;
  - introducing a reactant gas into said chamber;
  - and
  - pyrolyzing the reactant gas to deposit carbon nanotubes on the substrate.
2. The method of Claim 1, wherein the reactant gas comprises at least one member selected from the group consisting of acetylene, ethylene and mixtures thereof.
3. The method of Claim 1, additionally comprising the step of introducing ammonia gas into said chamber to activate the catalytic coating.
4. The method of Claim 1, wherein the substrate is in the form of a rod.
5. The method of Claim 1, wherein the substrate is made of at least one material selected from the group consisting of carbon, a metal and a ceramic.
6. The method of Claim 1, wherein the substrate is in the form of a fiber.

7. The method of Claim 1, wherein said catalytic coating is selected from the group consisting of cobalt, nickel, iron, chromium and alloys thereof.

8. The method of Claim 1, wherein the carbon nanotubes are grown in an orthogonal direction to a longitudinal axis of the substrate.

9. The method of Claim 4, wherein the carbon nanotubes are grown in a radial direction of the rod.

10. The method of Claim 1, wherein air is evacuated from the chamber by forming a vacuum in the chamber.

11. The method of Claim 1, wherein air is evacuated from the chamber by displacement with an inert gas.

12. The method of Claim 1, wherein the substrate is heated to a temperature of from 650-900°C.

13. In an apparatus for forming carbon nanotubes on a substrate comprising a chemical vapor deposition chamber, means for introducing a reactant gas into the chamber, a substrate holder and heating means for pyrolyzing the reactant gas and forming nanotubes on the substrate, the improvement comprising said heating means comprising a coiled filament and said substrate holder comprising means for supporting the substrate inside the coiled filament and being electrically biased with respect to the coiled filament.